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PROBATIONARY ESSAY

ON THE

EFFECTS OF PUNCTURE

RECEIVED IN DISSECTION;

SUBMITTED,

BY AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,

TO THE EXAMINATION OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR BODY,

IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE ADMISSION OF

ORDINARY FELLOWS.

BY

THOMAS JOHNSTONE AITKIN,

LECTURER ON MATERIA MEDICA AND PHARMACY, DEMONSTRATOR

ON ANATOMY, MEMBER OF THE MEDICO CHIRURGICAL SOCIETY,

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TO
JOHN AITKIN, M.D. F.R.S.E.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS,
LECTURER ON ANATOMY AND SURGERY, &c. &c. &c.


THIS ESSAY

IS DEDICATED,

WITH EVERY SENTIMENT OF GRATITUDE, AFFECTION, AND ESTEEM,

BY HIS BROTHER AND PUPIL,

THE AUTHOR.



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ON THE

EFFECTS OF PUNCTURE

RECEIVED IN DISSECTION.

FEW subjects, in the whole range of Medical and Surgical Science, claim a higher attention, at the present moment, than the Effects of Puncture received in dissecting the dead body. The increased attention paid to the investigation of disease, by examination after death, has rendered this affection one of the most frequent to which the surgeon, in the exercise of his profession, is exposed; and of late we have had to regret the loss of many eminent and many promising members of the profession. No apology would be requisite, on my part, in entering upon this disease, as the subject of my Probationary Essay, could I hope to add any thing

to what has already been done towards dispelling the obscurity which has hitherto surrounded it. I do not come forward with this hope; but have chosen the subject, because my daily pursuits have necessarily drawn my attention forcibly to the nature, causes, and treatment of this alarming disease. The same disease arises from other causes besides Puncture, and it is not a new malady; for it has occupied some attention from the earliest periods to which the records of medical knowledge extend. But the earlier authors failed to acquire distinct notions concerning it, because they confounded it, as has been shown by several authors, particularly by Dr. Duncan,* with several diseases, of which it is merely the consequence, or with which it is complicated, such as inflammation of tendons, fasciæ, veins, or absorbents.

To treat of the entire disease, to which Dr. Duncan has given the name “Diffused Inflammation of the Cellular Substance,” in a manner becoming its importance, and to investigate the causes by which it may be induced, the varieties which have been observed in the symptoms, the conse-

* Transactions of Medico-Chirurgical Society.

quences, the duration, the degree, and the extent of it, would lead me far beyond the limits to which I propose to confine myself on the present occasion. I mean, therefore, in the following pages, to present the more prominent features of that form of this affection only, which arises from wounds received in the dissection of the dead body.

This, I think, will be accomplished ; *1st*, By a brief statement of the symptoms and progress of the disease, together with an account of the appearances exhibited on dissection ; *2d*, Some observations on the exciting cause, and on the circumstances under which the disease arises ; and, *3dly*, A short review of the treatment which has proved most successful in practice.

The symptoms arising from **Puncture in Dissection**, like those of some other diseases allied to this in general character, are either local or constitutional.

Of those who wound themselves in dissection, some experience no other inconvenience than what would have arisen from a similar injury under any other circumstances,—the wound healing up with little or no irritation. Others, again, are fortunate enough to escape with the local affection only :

while some, less favoured, besides the local affection, suffer all the severity and danger of the constitutional disease.

The symptoms of the local affection are by no means uniform. But, in general, the first appearances which present themselves, are a small scratch or puncture, irritable and angry-looking, passing into a vesicle, containing a milky serous fluid, an erysipelatous blush beyond the margin of this vesicle, not uniform in its extent, and a slight tumefaction of the part affected. These appearances are accompanied by pain shooting from the wound along the arm, often as far as the arm-pit, where it is frequently very severe; sometimes stretching along the pectoral muscle, or even towards the head: red streaks, causing pain, frequently, but not always, pass along the arm, and the axillary glands are swollen. These symptoms, although they extend to a distance from the seat of the injury, are, nevertheless, strictly local, since they may occur, and often do occur, without any violent disturbance of the constitution; such as we shall presently find to arise, when the powers of nature, or those of medicine, are unable to check the progress of the disease.

But although the disease, in general, makes its attack in the way now described, it not unfrequently happens that its approaches are made in a more insidious manner. The local symptoms may be so slight as to escape notice, the wound may have been so trivial as to create no pain or draw no attention, when all at once the constitutional symptoms shew themselves, and then only is it discovered that any local affection had existed. This insidious mode of attack is well illustrated by the case of Professor Dease,* who, even after the constitutional symptoms had set in, felt so assured that he had received no Puncture, that he persevered in refusing to shew his hand to his medical attendant. The same case shews how rapidly, after the application of the cause, the disease, even as it affects the constitution, may be developed. For he appears to have received the wound about mid-day, and awoke next morning distinctly affected with the constitutional symptoms. The disease, however, does not appear to have often made a progress so rapid; and indeed the cases recorded, and those which I have witnessed, present so great varieties, that I do not

* Dublin Hospital Reports, vol. iii.

think we are yet prepared to lay down any general laws as to the period which elapses between the application of the cause and the rise of the disease—as to the duration of the local affection—or as to the circumstances which favour or retard the development of the constitutional disease. Yet, if I may be allowed to speak from my own experience, I should at present name from 24 to 36 hours, as the term usually intervening between the Puncture and the origin of the disease.

The symptoms which denote the accession of the constitutional malady, are, paleness and shrinking of the countenance, often death-like in degree, a sense of uneasiness, anxiety, irritability of temper, and general despondency, together with severe rigors. These rigors form a prominent feature in the disease, and are often prolonged for a great length of time. After these symptoms the pulse becomes strong, full, quick, and throbbing; thirst, nausea, and prostration of strength follow. As the disease proceeds, there is great irritability, intolerance of light and sound, urgent nausea and vomiting. The skin becomes dry and hot, the mouth parched, the tongue is furred and red on the margin, the urine is scanty and high coloured, the

bowels bound. The axilla becomes full, not merely from the enlargement of the glands, but also from an elastic swelling beginning there, of a peculiar character, to which the epithets, doughy, quaggy, or boggy, have been applied. This swelling is, at first, of a pale hue, afterwards becoming red, yet not in every case, diffuses itself over the *Pectoralis Major*, *Latissimus Dorsi*, *Serratus Magnus*, and the origin of the *Obliquus Externus Abdominis Muscles*;—it insinuates itself beneath these, and between their fasciculi and fibres. Vesicles are sometimes formed upon the skin over the affected member, which contain a serous fluid, vary in size and number, and are sometimes confluent. In most cases the breathing is more or less affected, and very commonly there is cough. The slightest motion cannot be borne. The patient labours under watchfulness, and, as the disease advances, delirium usually comes on. The prostration of strength becomes extreme. The countenance is expressive of great anxiety, the features relax, the pulse becomes intermittent, the voice hollow, breathing laborious, hiccup, apoplectic stertor, low muttering delirium, and coma appear, with subsultus tendinum and clammy sweats, and the patient rapidly sinks.

In many of the instances which have terminated favourably after the disease had become constitutional, perspiration has been remarked to form a critical discharge ; and, in one instance recorded by Dr. Duncan, the critical sweat was of a very fetid nature.

The duration of this disease is by no means uniform. It is sometimes prolonged for many weeks ; but the fatal termination rarely takes place beyond the fourteenth day.* Dr. Pett died in 105 hours ; Dr. Bell in 121. In some instances the progress to a fatal issue has been very rapid. It is equally various in the extent to which the parts of the body attacked by it are affected. The morbid changes are generally confined to that side of the body on which the puncture was received. In the case of Mr. Forbes,† the mesial line formed the boundary both on the sternal and dorsal aspect, between the diseased and healthy parts. In some instances the disease has been seen to spread continuously to the other side of the body, and in others, it has been found to pass by metastasis to the axilla,

* *Travers* on Constitutional Irritation, p. 223.

† *Edinburgh Med. and Surg. Journal*, No. 88.

knee, &c. of the opposite side. The morbid changes are frequently confined to the axilla and the parts in the immediate neighbourhood ; while they are found, at times, to extend over the trunk to the head, and even to the thigh ; the original wound being in the hand. These changes especially affect the cellular substance ; but they appear also to destroy the muscular fibre itself.

The appearances, on dissection, vary according to the duration of the disease, as well as according to the severity and other circumstances attending it. In general, however, where the fatal termination has been early, we may expect to find effusion of serous fluid in the cellular membrane affected, marks of increased vascular action in various other parts of the body, such as the brain, pleura, peritoneum, theca of the nerves, bronchial membrane. When the disease has been protracted to a longer period, we shall usually find sero-purulent matter, mixed with blood, or a yellow green pus, contained, at a less advanced period, in the cells of the reticular membrane ; but, at a later term in its progress, pervading and surrounding the whole of the parts implicated in the disease, and insinuated between the muscles, and between their fasciculi and fibres. The

axillary glands are found somewhat enlarged, but by no means in that degree in which the older notions entertained of the nature of the disease might lead us to look for. The muscular fibre is discoloured, sometimes rather pale, but, in most instances, dark, even approaching to black, and softened in its texture. Besides these more constant appearances, various other parts are occasionally observed to be changed from the healthy condition, arising doubtless either from previous disease actually existing, or produced contemporaneously with the principal affection, in consequence of morbid predisposition in particular textures. The textures most frequently changed in this way are the serous and mucous membranes, and the periosteum of the neighbouring bones.

On the exciting Cause, and the circumstances under which the Disease arises.

It need not surprise us to find a considerable difference of opinion among Pathologists as to the exciting cause of the severe symptoms which follow

punctured wounds received in dissection. It must be confessed, that the actual cause, and its mode of operation, are involved in obscurity, and of very difficult investigation, and that none of the opinions proposed to elucidate them are free from serious difficulties.

The opinions on this point are threefold. One party contend for the absorption of putrid matter ; another insist on a topical excitement, acting on an irritable constitution, dependent either on idiosyncrasy or accidental bad habit of body ; a third party hold to a specific virus, generated in the dead body under certain circumstances.

It may, at first sight, appear foreign to the purpose of an essay of this kind, to enter into a subject which is confessed to be almost entirely speculative, and, as yet, much too uncertain to admit of any practical application ; yet there are many facts connected with the opinions just hinted at, which, independently of their effect in supporting or invalidating some one of these hypotheses, possess, in themselves, an importance sufficient to entitle them to a place in every treatise on Puncture from Dissection. And I wish it to be understood, that I enter upon this part of the subject, rather with a

view of presenting these facts with some degree of connection, than from any desire to indulge a spirit of speculation.

In reference to the first-mentioned opinion, namely, that which attributes the disease in question to the absorption of putrid matter, there is one very remarkable fact, now established beyond all question, namely, that bodies recently dead are much more apt to give rise to bad consequences in the dissector, than those which are in a high state of putrescence. Nay, there is reason to think that a body in a high state of putrescence is incapable of calling forth those fatal effects which anatomists have of late so often witnessed from punctures received in the pathological examination of the recently dead body. It is true, indeed, that putrid matter from a decaying corpse, will, like any other kind of irritating matter, prevent a wound from healing kindly; will often cause a festered sore, and perhaps give rise to local symptoms extending to some distance from the original wound; but, so far as my experience goes, it will not induce a dangerous constitutional disease. The cases detailed in the several works on this subject amply confirm this statement. This is not certainly what we should

have expected *a priori* ; but since it is indisputably established, it is surprising that any should still hold the absorption of putrid matter to be the exciting cause of the disease,—an opinion so completely refuted by every day's experience.

The opinion next hinted at, that, namely, which supposes a topical irritation, independently of a morbid virus, to act on a strong predisposition existing only in a few individuals, either naturally, or from accidental causes, is not without some foundation. It is impossible to deny that many escape the disease who have been exposed, even in a higher degree, to the same cause which gave rise to the disease in others, and that some individuals seem to be uncommonly susceptible of the influence of the unknown morbid agent. But the effect of predisposition is observable in all diseases generated by specific poison ; and, on the same ground, we might attempt to prove that Syphilis requires no specific poison for its production. Now, while it is admitted, on the one hand, that the disease in question is more frequent in a bad habit of body, it cannot be denied, on the other, that many have fallen victims to it, in whom not the slightest predisposition could

be discerned. This opinion, therefore, must require additional proof ere it can be admitted as true.

The opinion which holds, that the disease under consideration arises from a specific virus, if not clearly established, seems to me, at least, to rest on firmer grounds than the rival hypotheses. But, as I have already remarked, I am less desirous to establish an hypothesis, than to find an opportunity to state such facts as strike me to possess in themselves an importance sufficient to entitle them to attention.

The fact which I conceive to be most important in itself, and at the same time to offer the strongest evidence in favour of the hypothesis in question is, that the bodies of those chiefly, who have died under certain diseases, seem to have the power to induce, on Puncture, some fatal constitutional disease. If we look to the cases recorded of late, detailing the circumstances under which this disease has arisen, we shall find that the great majority of them has taken place from the dissection of the bodies of those who have died in consequence of disease in serous membranes. It must be confessed that we cannot refer all the fatal cases to such an

origin ; but still we are entitled to assume, that something peculiar in the mode of decomposition, that is, something differing from the ordinary putrefaction of a dead body, is requisite to give rise to the phenomena in question, which is nearly equivalent to saying that a specific virus is generated. It may be observed, at this place, that there is something remarkable in the circumstance, that a substance generated by the disease of a serous membrane, should, when taken into another body, produce its chief effects on the cellular tissue. In how far this may arise from a similarity of structure and function, is a point that deserves consideration.

Another fact, of much importance in itself, tends, in some degree, to support the idea of a specific virus. I mean the nature of the wound which gives rise to the disease. On a review of the cases published, we find that the wounds which caused the mischief, are almost invariably punctured wounds,—wounds usually inflicted by the needle in sewing up the body ; and, what appears surprising, often so slight as to draw no attention at the time. Incised wounds have scarcely been found capable of transmitting the unknown cause of this disease. In illustration of this point, I shall notice a case which

fell under my own observation.—In dissecting the body of a woman who had recently died of puerperal fever, Mr. Thomas Annandale, an apprentice of my Brother, received two incised wounds ; he continued the dissection, even after the court-plaster, with which they had been covered, came off,—yet no mischief followed. Mr. Gill, another pupil, on the other hand, when the dissection was finished, took the scissars, and merely punctured the intestine, to allow the flatus to escape ; in returning the instrument to the case, he slightly punctured his hand, which he washed, and thought no more of it, till, on the second day, he was seized with the severe constitutional symptoms, and did not recover till after three months of great suffering.

That morbid poisons are conveyed into the body much more readily through punctured wounds than through incised wounds, is fully proved by the experiments of Dr. Russel, made on the introduction of the venom of serpents into the animal body. He seldom succeeded in introducing, even the most virulent, by means of the scalpel, even when every precaution was taken to prevent the flow of blood ; with the needle he seldom failed to induce the usual effects of the poisons employed ; while the hook, he found, was the most certain and speedy instrument of

introduction, and, in degree of effect, almost equalled the bite of the serpent itself. The same fact is strengthened by the mode in which vaccination is practised. It is by Puncture that the surgeon succeeds in this operation ; while incision almost constantly fails.

TREATMENT.

There is at present a considerable difference of opinion among the members of the Profession, in regard to the mode of treating the consequences of wounds in dissection. Many of the modes proposed seem at variance with sound principles of practice, by which alone we ought to be guided in cases where experience has not pointed out distinct exceptions to our general rules. In the brief account which I am now about to give of the treatment, I shall not hesitate to blame what I cannot believe to be useful ; at the same time that I bring forward the result of twelve years experience in the dissecting-room.

Before proceeding to notice the treatment of either the local affection, or of the constitutional disease, I shall state some of the means by which the anatomist may be secured against the serious consequences of Puncture.

In examining the recently dead body, particularly if any disease of a serous membrane has been the cause of death, the hands should be anointed with oil, or with lard; and particular care should be taken to avoid puncturing the hands with spiculæ of bone, in opening the skull and thorax; and, above all, to be on guard against the Puncture of the needle in sewing up the body. Gloves have been recommended, but I consider them hurtful; with them one is more apt to suffer by using the instruments awkwardly; besides, the gloves becoming soaked with the morbid fluids, must be quite the reverse of any protection, if there is an abrasion in the cuticle.

If, notwithstanding his care, the dissector receives a wound, let him immediately wash the part with warm water and soap; thoroughly suck the wound for five or ten minutes, and enlarge it with the lancet, so as to favour the flow of blood. Sucking the wound is of the highest importance;

and it is probably from the want of it, when the wound escapes notice, that small scratches have so much oftener given rise to serious consequences than deeper wounds.

The preparation of bodies, for the use of the dissecting-room, by antiseptic processes, belongs to the prophylaxis, and is of the greatest importance. The rare occurrence of serious consequences in anatomical theatres is, in a great measure, to be attributed to such a precaution. The case of my friend and former pupil, Mr. Forbes, seems, at first view, to raise a doubt as to the efficacy of these modes of preparation. Mr. Forbes supposed he had received a Puncture in dissecting a body so prepared, but did not remark it at the time. He was engaged in dissecting this body for two or three hours only, on the same morning on which he became affected with the constitutional symptoms; but he had a few days before assisted in the examination of the same body previous to interment; and, after it had been obtained for the theatre, he had, at my request, injected it, by the abdominal aorta, with a solution of nitrate of potash. The cause of death was peritoneal inflammation. Now, if Mr. F. is right in his opinion as to the time when he received

the wound, not more, at the utmost, than three and a half hours could have elapsed between the time of its infliction and the appearance of the constitutional symptoms—a thing scarcely possible, and not borne out by any case hitherto recorded. It is easy to suppose that he pricked himself, without being conscious of it, at one or other of the times when he had been operating on the same subject, previous to the process of preparation by antiseptics. What confirmed me in this opinion is, that I well remember noticing how pale and ill he looked when he began the dissection, in the course of which he supposed he had received the wound.

But, to proceed to the actual treatment. If, notwithstanding the careful sucking of the wound, symptoms of irritation shew themselves, it is usual to apply a poultice. Both excision and the use of caustics have been recommended in Puncture; the former of these I have practised on my own person, at a time when I was unnecessarily, as I now think, under great apprehension, on account of a purely local affection. I have no hesitation in saying, that I not only do not approve, but altogether disapprove, of their use in any case of this kind. To apply caustics, or to practise excision in

every case of injury which occurs in a dissecting-room, would amount almost to folly ; since scarcely one case out of one hundred ever gives rise to any serious consequences. Nor do I see what good can result from it, were it applied even immediately on receiving the wound. And it is plain that it must be worse than useless, when the wound has festered, or when disease has become constitutional.

Among the many modes proposed, of late, for the treatment of the disease, when it has become constitutional, is the stimulant plan of cure recommended by Mr. C. Bell and Mr. Shaw. They advise the free use of wine or porter, along with camphor, opium, ammonia, capsicum, and the like. To this plan of treatment I cannot subscribe, since, from what I have seen of the disease, it seems opposed to all just principles of medicine. It is true such a mode of practice may, in the latter stage of the disease, become necessary ; but, so far as I have witnessed, the symptoms do not justify such remedies, and, in the few instances in which I have seen them employed, they were manifestly injurious.

The antiphlogistic treatment is that which, according to my own experience, and that of those

whose practice I have witnessed, has proved, in general, beneficial. Blood-letting, both local and general, is the remedy which has appeared to possess the greatest influence over the symptoms. Added to this remedy, laxatives and diaphoretics, as occasion required. An opiate I have seen produce the best effects. Along with this treatment, a spare diet has been enjoined. When fluctuation is found, the tumour should be immediately opened.

But there is a remedy which I have been induced to try, and which, in efficacy, has equalled my expectations: I mean mercury, particularly under the form of calomel. I was led to make trial of this remedy, from considering the excellent effects it has been found to produce in the first stage of hydrocephalus, in enteritis, puerperal fever, and the like. In proof of which, I may quote the authority of Dr. Winterbottom, and can attest its efficacy myself from what I have seen in my Brother's practice. I have, besides, seen mercury employed in two of the cases of Puncture mentioned above, namely, in the cases of Mr. Forbes and Mr. Gill; in these it was only moderately employed; and in the former, not till a late period of the disease: but, nevertheless, produced a decidedly bene-

ficial effect. But the plan which I now propose, is to give calomel, in divided and frequently repeated doses, in order to affect the system as speedily as possible, care being taken to prevent its action on the stomach and bowels. At the same time I do not mean that it is to be employed to the exclusion of the remedies just mentioned; and, in particular, I hold that blood-letting should in general be premised. In evidence of the efficacy of this plan, I shall give a brief account of a case which lately came under my observation and treatment, and with it I shall close this Essay.

— M'Nab, a porter, aged 27, applied to me for advice on 16th September, on account of a severe pain in the axilla, accompanied with swelling, extending over the Pectoralis Major, Serratus Magnus, and Anterior Margin of the Latissimus Dorsi; —there was no discolouration. He stated that he had suffered much from rigors the preceding night. On inquiry, I found he had, on the 14th, received a slight scratch from a knife, used for domestic purposes, and probably contaminated with animal matter;—that, soon after, pain extended up the right arm, like threads, but not to such an extent as to excite particular attention. He was ordered

to apply 18 leeches to the arm-pit,—to take 6 grs. of calomel, with a scruple of Dover's powder, at bed-time ; and use a solution of sulph. magnes. the next morning, till the bowels were freely opened. On calling the following day, I found that, through mismanagement, only one leech had operated. I then determined to have recourse to mercury, on the grounds already stated. I directed 16 grs. of calomel, one scruple of kino, and 4 grs. of opium, to be divided into four powders, one of which was to be administered every four hours ; an ounce of castor oil to be taken the following morning, if the bowels continued bound.

18th, The symptoms the same, but the rigors had not returned. The same treatment continued.

19th, Little change ;—a scruple calomel, 2 scruples kino, and 4 grs. opium were divided, and given as before.

20th, No change in symptoms or treatment.

21st, All the symptoms ameliorated. Skin moist ; tongue clean ; general uneasiness much abated ; thirst no longer urgent. The powders to be continued ; and let him take an anodyne antimonial draught at bed time.

22d, Gums sore, but no salivation. Feels much relieved. Swelling and pain over the Pectoralis, Serratus, and Latissimus Dorsi muscles, are removed; a hard swelling still in the axilla. Let him have a beef-steak with porter. Let the ung. hydrarg. fort. be rubbed in the axilla.

28th, Tumour opened to day, and three ounces of well-formed pus discharged. From this time the recovery was progressive, and, on October the 2d, he was dismissed cured.

In this case, my object was to induce, as early as possible, the effect of mercury on the functions of the body, particularly on the vascular and secreting systems;—the first indication of which is, in general, the soreness of the gums; while, at other times, a relaxation of the skin, or an increased action of the kidneys, is the sign of its influence. The kino and opium were designed to obviate its effect on the stomach and bowels; while the castor oil, by securing one full motion daily, would prevent any increase of irritation from constipation. Where the circumstances are urgent, I should repeat the calomel in the same dose, at shorter intervals, as, for example, at the end of two hours, or even every hour. Indeed, in the present case, I regret I did

not push the use of the calomel to a greater extent ; for I am disposed to think, that, by a freer use of it on the 17th and 18th, I might have prevented altogether the suppuration from taking place.

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